

Claims:

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1. A position detecting system comprising a beam irradiating means for irradiating an electron beam to a sample including a portion to be measured, a beam scanning means for relatively scanning the electron beam so that the electron beam moves in relation to the portion to be measured in the sample, a voltage applying means for applying a voltage to the sample which is scanned by the electron beam, a current detecting means for detecting a current flowing in the sample because of the applied voltage, and a position detecting means for detecting the position of the
10 portion to be measured with reference to the scanning start position of the electron beam and the position when the detected current changes.

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2. A position detecting system claimed in Claim 1 wherein the position detecting means is configured to detect the position of the portion to be measured with reference to the scanning start position of the electron, on the basis of the scanning start time of the electron beam and the detected current changing time.

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3. A position detecting system claimed in Claim 1 further including a size measuring means for measuring the size of the portion to be measured, on the basis of a difference in the coordinates between two positions detected by the position detecting means.

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4. A position detecting system claimed in Claim 1 further including a size measuring means for measuring the size of the portion to be measured, by multiplying a scanning speed of the electron beam by the time during which the current is at a changed level.

5. A position detecting system claimed in Claim 1 wherein the voltage applying means periodically changes the voltage applied to the sample.

6 A position detecting system claimed in Claim 1 further including an
5 electron detecting means for detecting at least one of the secondary electrons and the reflected electron from the sample, and a measuring means for measuring the size of the portion to be measured on the basis of the scanning start position of the electron beam and the position when the amount of the detected electrons changes.

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7. A position detecting method comprising the step of irradiating an electron beam to a sample including a portion to be measured, relatively scanning the electron beam to cause the electron beam to move in relation to the portion to be measured in the sample, applying a voltage to the
15 sample which is scanned by the electron beam, detecting a current flowing in the sample because of the applied voltage, and detecting the position of the portion to be measured with reference to a scanning start position of the electron beam and the position where the detected current changes.

20 8. A position detecting method claimed in Claim 7 wherein the position of the portion to be measured is determined with reference to the scanning start position of the electron, on the basis of the scanning start time of the electron beam and the detected current changing time.

25 9. A position detecting method claimed in Claim 7 wherein the size of the portion to be measured is determined on the basis of a difference in

the coordinates between two positions detected by the position detecting means.

5 10. A position detecting method claimed in Claim 7 wherein the size of the portion to be measured is determined by multiplying a scanning speed of the electron beam by the time during which the current is at a changed level.

10 11. A position detecting method claimed in Claim 7 wherein the voltage applied to the sample is caused to periodically change.

15 12. A position detecting method claimed in Claim 7 wherein at least one of the secondary electrons and the reflected electron from the sample, is detected, and the size of the portion to be measured is measured on the basis of the scanning start position of the electron beam and the position when the amount of the detected electrons changes.

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